cm leaf area respectively, whereas that of female consumed 0.20±0.11, 0.36±0.43, 0.75±0.48, 0.57±0.45, 1.36±0.64, 10.04±0.77 sq. cm leaf area respectively.

RESEARCH ASST. (ENTOMOLOGY),
REGIONAL RESEARCH STATION,
COLLEGE OF AGRICULTURE,
DHARWAD 580 005.

M. MANJUNATHA
G. T. T. RAJU

ASSOCIATE PROFESSOR,
DEPT. OF SERICULTURE,
UAS, GKVK CAMPUS, BANGALORE 560 024.

D. N. R. REDDY

ASSISTANT ENTOMOLOGIST,
REGIONAL AGRICULTURAL RESEARCH STATION,
SHILLONGANI,
NOWGONG 782 001, ASSAM,
January 21, 1986.

S. K. DUTTA

REFERENCES

BALTAZAR, E. P. (1970): Biological study of *Aspidomorpha miliaris* (Fabricius) (Chrysomelidae: Coleoptera) with a consideration of its host range and natural enemies. *Phillippines Entomologist. 1*: 365-377.

DAVID, B. V. & MUTHAIH, M. (1960): *Aspidomorpha miliaris* F. as a new pest of *Ipomoea cornea* Jacq. in South India. *Madras agric. J. 47*(4): 178.

GUBBAIAH & DEVAIAH, M. C. (1978): Occurrence and biology of *Aspidomorpha sanctacrucis* (F.) on *Ipomoea* spp. *Curr. Res., 7*: 156-157.

REDDY, D.N.R. & PUTTASWAMY (1981): Record of pests of *Ipomoea*, the ornamental creepers. *Curr. Res., 10*: 136.

29. A STUDY ON THE EFFECTS OF CERTAIN ABIOTIC FACTORS ON THE ACTIVITY OF *MYLLOCERUS LAETIVIRENS* NABL. (COLEOPTERA: CURCULIONIDAE)

INTRODUCTION

Myllocerus laetivirens is a very serious pest of trees and plants. Its ecology has not been studied so far. An attempt has been made here to find out the correlation between the yearly activity of this beetle with certain abiotic factors at Pilani (Rajasthan).

MATERIAL AND METHODS

The beetle was caught with the help of Pilani type light trap (Kundu *et al.* 1961) operated daily for two years (1976-1977) from dusk to dawn at Pilani (Pilani is on the North-eastern side of Jhunjhunu District of Shekhawati region in semi-arid zone of Rajasthan, India, Its geographic position is 28°20′N latitude and 75°35′E longitude and 330 msl.)

The dependent factor, i.e. the yearly activity of *M. laetivirens* has been correlated with the various independent abiotic factors, i.e. 8.30 A.M. relative humidity, 5.30 P.M. relative humidity, minimum temperature, maximum temperature, mean temperature and rainfall. In order to achieve this, regression analysis, partial regression analysis, multiple regression analysis and Beta coefficient analysis has been conducted.

The numbers of all the captures of *M.*

laetivirens have been converted to log values from which all mathematical calculations have been done (Williams 1937). Five day means of the log values of the capture have been used for the purpose of calculations (Chand 1979). Since the value of log of zero is minus infinity, one has been added to all catches before taking their log values (Williams 1939).

Results

The various regression equations obtained on *M. laetivirens* due to the effect of eight various abiotic factors for the period January to December [both years (1976-1977) taken together] are given below:

i) Soil moisture $Y = 0.1736X + 0.0930$: ($r = 0.7373$, $P < 0.001$)

ii) 8.30 A.M. relative humidity $Y = 0.0260X - 1.4572$: ($r = 0.5575$, $P < 0.001$)

iii) 5.30 P.M. relative humidity $Y = 0.0230X - 0.5700$: ($r = 0.6192$, $P < 0.001$)

iv) Mean relative humidity $Y = 0.0261X - 1.0821$: ($r = 0.6109$, $P < 0.001$)

v) Maximum temperature $Y = 0.0166X - 0.1181$: ($r = 0.1312$, $P < 0.01$)

vi) Minimum temperature $Y = 0.0507X - 0.4274$: ($r = 0.5362$, $P < 0.001$)

vii) Mean temperature $Y = 0.0427X - 0.6286$: ($r = 0.3784$, $P < 0.001$)

viii) Rainfall $Y = 0.0984X + 0.2505$: ($r = 0.5479$, $P < 0.001$)

The extent of increase or decrease in various climatic factors required to double the catch is as below:

Soil moisture (%)	= 1.71%
8.30 A.M. relative humidity	= 11.57%
5.30 P.M. relative humidity	= 13.08%
Mean relative humidity	= 11.53%
Maximum temperature	= 18.13°C
Minimum temperature	= 5.93°C
Mean temperature	= 7.04°C
Rainfall	= 3.05mm

The values of partial correlation coefficients of log catch on various climatic factors are given in Table 1.

Multiple regression equation derived is given below:

$$Y = 0.5547 + 0.1366X_1 + 0.0060X_2 + 0.0014X_3 - 0.0638X_4 + 0.0763X_5 - 0.0550X_6$$: ($r = 0.8466$, $P < 0.001$)

The Beta regression coefficient values due to the various climatic factors are:

Soil moisture (%)	= 0.5713
8.30 A.M. relative humidity (%)	= 0.1300
5.30 P.M. relative humidity (%)	= 0.0396
Maximum temperature	= –0.5038
Minimum temperature	= 0.8068
Rainfall	= –0.3066

Based upon the multiple regression analysis technique, the level of increase required in a particular parameter in order to double the catch of this beetle, keeping all other parameters constant at that time are given below:

Soil moisture (%)	= 2.20
8.30 A.M. relative humidity (%)	= 50.16
5.30 P.M. relative humidity (%)	= 215.00
Maximum temperature (°C)	= –4.71
Minimum temperature (°C)	= 3.94
Rainfall (mm)	= –5.47

Discussion

Based upon the values of simple correlation coefficients, it is evident that the highest value is obtained due to soil moisture (=0.7373)

followed by 5.30 P.M. relative humidity (r = 0.6192), mean relative humidity (r = 0.6109), 8.30 A.M. relative humidity (r = 0.5575); rainfall (r = 0.5479); minimum temperature (r = 0.5362), mean temperature (r = 0.3784) and maximum temperature (r = 0.1312). All, except maximum temperature, are significant at $P<0.001$ level. Further the most influential value of regression coefficient is obtained on soil moisture (0.1736).

It is observed that the minimum level of increase required in a certain parameter in order to evoke a response in the log catch of *M. laetivirens* to double itself, is found in case of soil moisture (1.71%) followed by rainfall (3.05 mm) and minimum temperature (5.93°C). So, according to the results of simple regression analysis it seems that soil moisture, rainfall and minimum temperature are more influential in that order. Also, the relative humidity parameters exercise almost equal influence role. However, minimum temperature seems to play an insignificant role in determining the log catch of *M. laetivirens* ($r = 0.1312$, $P<0.01$).

The salient feature of partial regression analysis is that soil moisture in fact, derives its influence indirectly from rainfall and acts most positively on the log catch (Table 1). On the contrary, rainfall itself seems to acquire a negative role individually; obviously soils get water only if rains are there.

The coefficient of multiple correlation is 0.8466 which is significant at $P<0.001$ level, thus 75% variability in the log catch is associated for by a linear combination of soil moisture (X_1), 8.30 A.M. relative humidity X_2, 5.30 P.M. relative humidity X_3, minimum temperature X_4, maximum temperature X_5 and rainfall X_6, according to the following regression:

$$Y = 0.5547 + 0.1366X_1 + 0.0060X_2 + 0.0014X_3 - 0.6384X_4 + 0.0763X_5 - 0.0550X_6$$

TABLE 1

SHOWING THE PARTIAL AND SIMPLE REGRESSION COEFFICIENTS OF LOGCATCH FOR *M. laetivirens* CLIMATIC FACTORS FOR THE PERIOD JANUARY TO DECEMBER BOTH YEARS (1976-1977) TAKEN TOGETHER

Climated variables Independent variables	Soil Moisture	8.30 A.M. R.H. %	5.30 P.M. R.H. %	Mean R.H. %	Maximum temp. (°C)	Minimum temp. (°C)	Mean temp. (°C)	Rainfall	Simple Regression
Soil Moisture	—	0.1480	0.1384	0.1395	0.1756	0.1486	0.1639	0.2441	0.1765
8.30 A.M. R.H. %	0.0099	—	0.0030	−0.0178	0.0333	0.0252	0.0294	0.0179	0.0260
5.30 P.M. R.H. %	0.0091	0.0209	—	0.0178	0.0253	0.0197	0.0227	0.0168	0.0230
Mean R.H. %	0.0105	0.0417	0.0061	—	0.0306	0.0234	0.0270	0.0189	0.0261
Maximum temp.	0.0142	0.0612	0.0358	0.0441	—	−0.1359	−0.2719	0.0172	0.0166
Minimum temp.	0.0256	0.0491	0.0403	0.0438	0.1357	—	0.2715	0.0374	0.0507
Mean temp.	0.0229	0.0545	0.0410	0.0466	0.2717	−0.2717	—	0.0316	0.8427
Rainfall	−0.0592	0.0659	0.0499	0.0541	0.0986	0.0742	0.0884	—	0.0984

which may be interpreted to mean that estimated log catch increases or decreases by a value equal to the net regression coefficients of the respective climatic factors as shown in the equation.

From the absolute values of Beta coefficients it is apparent that the order of relative importance of the different climatic factors is as follows:

Soil moisture (0.5713), Minimum temperature (0.8068), 8.30 A.M. relative humidity, 5.30 P.M. relative humidity, and negative values are obtained on maximum temperature (–0.5038) and rainfall (–0.3066).

From the above account it is clear that soil moisture and minimum temperature are the two most influential climatic factors in determining the log catch of *M. laetivirens*, and maximum temperature and rainfall tend to play a negative role whereas the abiotic factors considered are insignificant.

ACKNOWLEDGEMENTS

We are grateful to Dr. C. R. Mitra, BITS, Pilani. Thanks are also to U.G.C. for providing financial assistance to RC and AK.

ROHTASH CHAND

ZOOLOGY DEPARTMENT,
KURUKSHETRA UNIVERSITY,
KURUKSHETRA.

A. K. THUKRAL

BIOLOGY DEPARTMENT,
BITS, PILANI-337 031, INDIA,

H. L. KUNDU

MOSCOW STATE UNIVERSITY,
MOSCOW, USSR.

October 23, 1985.

REFERENCES

CHAND, ROHTASH (1979): Ecological studies on certain photopositive Coleopterans around Pilani (Rajasthan). Ph.D. Thesis, B.I.T.S., Pilani, India.

KUNDU, H. L., DATTAGUPTA, A. K. & GUPTA, B. B. (1961): A study of abundance of certain insects of Pilani with the help of a light trap. *Proc. Raj. Acad. Sciences, 8*: 79-87.

WILLIAMS, C. B. (1937): The use of logarithms in the interpretation of certain entomological problems. *Ann. appl. Biol., 34*: 406-414.

——————— (1939): An analysis of the four years captures of insects in the light trap. Part I. General Survey, Sex Proportion, Phenology and times of flight. *Trans. R. Ent. Soc. London., 89*: 79-131.

30. DEVELOPMENTAL BEHAVIOUR OF ALATE AND APTEROUS FORMS OF *MYZUS PERSICAE* (SULZER) ON ROCKET SALAD IN PUNJAB[1]

INTRODUCTION

Myzus persicae (Sulzer) has been reported to cause injury of economic significance on rocket salad (*Eruca sativa* Linn.) in Punjab (Sandhu *e tal.* 1981). The pest is cosmopolitan in distribution (David 1957). In India it has been reported from all the states (Ghosh 1974, Verma and Misra 1975, Verma 1977). The insect is polyphagous in nature and has been reported to feed on 221 different hosts

[1] A part of the Thesis of the junior author approved for M.Sc. (Entomology) degree of Punjab Agricultural University, Ludhiana, in 1984.